

## **ABSTRACT**

**THESIS:** Constraining the Age of the Nouméa Basin: Isotope Ages and Paleomagnetic Data from New Caledonia

**STUDENT:** Kristopher T. Orton

**DEGREE:** Master of Science

**COLLEGE:** Sciences and Humanities

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### **Abstract**

Geological evidence suggests large-scale continental extension during the breakup of the eastern Gondwana margin was the predominant force controlling rifting of New Caledonia from the eastern Gondwana margin and formation of the Tasman Sea in the Late Cretaceous. Tectonic models suggest slab-rollback forces elongated and thinned the crustal lithosphere detaching crustal fragments from the Gondwana margin. Current tectonic models lack detailed timing and placement of this crustal detachment with respect to New Caledonia based on lack of evidence (rocks). An isotope and paleomagnetic study was carried out on a bi-modal assemblage of volcanic rock exposed on the southwest side of New Caledonia in the Nouméa Basin. U/Pb isotope ages of zircon grains found within siliceous volcanic rock in the Nouméa Basin provide temporal evidence that volcanism persisted both before and after the breakup of the eastern Gondwana Continent (100-90 Ma) in the Late Cretaceous. Four isotope ages >97 Ma and a series (11 samples) ranging from 91-76 Ma constrain the siliceous volcanism of the Nouméa Basin to the Late Cretaceous. A paleomagnetic inquiry utilizing statistics of

both McFadden/Reid and Fisher carried out on 16 Nouméa Basin siliceous and mafic *in situ* formations place the oldest volcanic units found within the Nouméa Basin at 65° S latitude as New Caledonia began to separate from Gondwana (~100 Ma). The data suggests a well-developed arc signature in the region, which persisted for at least 15 Ma in the Late Cretaceous. Compared to current tectonic models of the southwest Pacific Region from the Late Cretaceous to Eocene, our data suggests New Caledonia was further south on the eastern Gondwana supercontinent prior to rifting in the Late Cretaceous than current models.